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filling interstices between its crystals. The author is inclined to regard the ore as having separated from the rock magma, but, whether in accordance with the Soret principle, or not, he is unwilling to say.

A variolite in a small dyke at Dunmore Head, County Down, Ireland, is described by Cole[10] as an altered glass containing spherulites composed of cryptocrystalline material with a delicately radial structure. Cracks traverse the spherulites and also the groundmass of the rocks. Into some of those in the spherulites glass has been forced. Occasionally the nuclei of spherulites are crystals of plagioclase.

In a general geological article on the Essex and Willsboro' Townships in Essex Co., N. Y., White[11] records the existence of a number of bostonite, fourchite, camptonite and other dykes cutting the country rocks of the region.

GEOLOGY AND PALEONTOLOGY.

The Lakes of Central Africa.—Concerning the origin of the Central African lakes, Dr. D. Kerr-Cross advances the theory that these lakes were in the first instance, arms of the sea, as the Red Sea is at the present time. During Cenozoic time the whole continent participated in a general movement resulting in the crushing, subsidence, faulting, and upheaval which are evident on every hand. The fauna living on during these successive changes has gradually adapted itself to the varying environment. This theory is founded on the following facts collated from the author's own observations, and those of other East African travelers:

1. East Africa is a country of table-lands.
2. Its lakes, Tanganyika, Nyasa, Rulswa, Bangweolo, Newero, and to some extent those further north—not to speak of the lesser lakes—run more or less in the lie of the continent north and south, and are separated from the sea to the east by highland, and are environed by great mountain systems remote from those of the coast range.
3. The lakes are all at high elevation.
4. Some of the lakes have evidence of great volcanic activity having taken place in late geological time. There are recently extinct craters, and hot springs and lava flows.

[10] Geol. Magazine, April, 1894, p. 220.

[11] Trans. N. Y. Acad. Sci., xiii, p. 214.

5. There is a decided parallelism between the lakes and the strike of the mountains, and they occupy vast valleys surrounded by high ground or table-land.

6. The mountains consist chiefly of crystalline and schistose rocks and gneiss.

7. The number of the lakes in the centre of the continent is great, some are salt, some brackish with sodium and magnesium salts, and some are fresh.

8. Most of them have islands.

9. Some are surrounded by markedly escarped hills, with terraces rising from them. Some of these terraces denote a former higher level.

10. In some places the lakes are extremely deep. Notably Lake Nyasa shows great variation of level.

11. The fauna shows a marked resemblance to marine forms. (Geog. Journ., Feb., 1895.)

Structure of Triarthrus.—Additional discoveries relating to Triarthrus give rise to the following observation, by Mr. C. E. Beecher, upon its general organization:

" The simplicity and primitiveness of the trilobite structure will first impress the student. The variable number of segments in the thorax and pygidium in the different genera shows the unstable metameric condition of the class. The head alone seems to have a permanent number of segments and appendages. . . . . . . With the exception of the antennules, all other paired appendages of the animal seem to agree in every point of structure, and vary only in the relative development of certain parts. The appendages of the pygidium are ontogenetically the youngest, and express the typical phyllopodiform structure. Passing anteriorly, the joints become less leaf-like, until in the anterior thoracic legs they are quite slender, and the limbs resemble those of schizopods. Corresponding to this, there is through the whole series, a gradual development of a process from the coxopodite, forming a gnathobase to the limb. On the head these serve as true manducatory organs. Posteriorly, they were like the basal endites of *Apus*, and enabled the trilobite to convey food along the entire length of the axis to the mouth."

In regard to the affinities of the Trilobita, and especially their relations to Apus, Mr. Beecher points out while a general similarity of of the cephalic organs of *Apus* and *Triarthrus* is apparent, yet there are important structural features of other parts of the body in the latter which are quite dissimilar from *Apus* and the higher crustacea, and the exact relations of the trilobite with any one group cannot be considered as fixed. Points of likeness may be established with almost every order, showing chiefly the relationship between the trilobite and the ancestors of the modern Crustacea. (Amer. Geol., Vol. XV, 1895.)

Land Animals of the Canadian Paleozoic.—The paucity of fossil remains of land animals in the older rocks renders the finding of new material of special importance. Accordingly, the announcement by Sir William Dawson of the discovery of a number of Paleozoic air-breathing animals is of great interest. Forty-three individuals, representing a number of species, have been taken from the interior of two erect trees in the Joggins Coal Mine—the same locality in which the first known Paleozoic land snail was found in 1851.

Descriptions of these remains are embodied by Sir William Dawson in a Synopsis of Air-breathing Animals of the Paleozoic in Canada, up to 1894. The Synopsis contains references to the publications in which the various species have been described, and to their localities, discoverers, and dates of discovery and description. The species described in the Synopsis are distributed as follows:

Vertebrata 26; all Batrachia.
Arthropoda 33; viz., Insects, Scorpions, Myriapods.
Mollusca 5; Pulmonate Snails.

Four of the vertebrate species are named for the first time in this paper—two from osseous remains, and two from foot-prints.

The paper concludes with a note of advice to collectors as to where and how to obtain this valuable Paleozoic material. (Trans. Roy. Soc. Canada, Sect. IV, 1894.)

The Devonian System of Eastern Pennsylvania and New York.—In a paper containing an account of a field investigation of the Devonian system of eastern Pennsylvania and New York, Mr. Prosser takes exception to the terms used by the Pennsylvania Geological Survey and proposes certain changes to bring the correlation of the Pennsylvania section nearer to that of New York. From paleontological data Mr. Prosser has been enabled to compare the formations of this region with the typical sections of the Devonian system of Central New York.

Mr. Prosser finds the Marcellus shale clearly defined, the Hamilton (of White) the Genesee shale (of White) and Tully limestone (of

White) constitute the Hamilton stage; true Genesee shales and Tully limestones are wanting; the Chemung (of White) is found to be Lower Portage; beginning with the Starucca sandstones and New Milford red shales there is a series of deposits equivalent to the Oneonta sandstones of New York; the line of demarkation between the Chemung and Catskill lies at the base of the sandstones overlying the Montrose shales; and, finally, the Mount Pleasant Conglomerate on the Pocono Plateau represents the base of the Pocono.

The classification proposed by Prosser then would be as follows:

Lower Carboniferous	Pocono	Mount Pleasant Conglomerate.
Upper Devonian	Catskill	Mount Pleasant Red Shale. Elk Mountain sandstone and shale. Cherry Ridge Group. Honesdale sandstones.
	Chemung	Portage (including Oneonta) (of Prosser). Chemung (of Prosser).
Middle Devonian	Hamilton	Hamilton (Prosser). Marcellus shales.
Lower Devonian	Corniferous	Upper Helderberg. Cauda-galli grit.

The English Tarns.—While investigating the Tarns of Lakeland, England, with the view of determining their origin, Mr. J. E. Marr discovered that many basins supposed to be rock-bound were in reality not true rock-basins, although the streams issuing from them run over solid rock close to the surface of the lake. The facts as observed by the author are these: Some of the tarns were moraine-dammed at the exit. Should the exit of the lake thus formed immediately overlie the old river-bed, the lake would have a brief existence, for the morainic material would soon be worn away. If, however, the lowest point of the morainic barrier did not lie vertically over the old river valley, the out-let stream would cut rapidly until it reached the level of the rock, and then in the majority of cases would cut sideways along the junction of the rock and the drift until it reached its original position, when the lake would be drained. But if a ridge of rock lay between the position attained by the stream issuing from the lake and the position of the former valley-bottom, denudation would be retarded, the lakelet would become much more permanent, and its basin would be apparently rock-bound, with its surplus water flowing over a rocky outlet.

Mr. Marr concludes since many of the Tarns he examined are instances of the third class described above, that the lakes of that region, at least, give no support to the theory that the basins in which they occur were hollowed out by ice. (Quart. Journn. Geol. Soc. Feb., 1895.)

The Loess of Northern China.—The superficial deposits of Shantung formed the subject of a paper by Messrs. Skertchly and T. W. Kingsmill read before the Geological Society of London at a recent meeting in which some interesting facts were made known concerning the Loess of that region. The Loess east of the Pamirs is extensively developed over an area of over one million square miles. It is sometimes over 2000 feet thick, and occurs up to several thousand feet above sea-level. Evidence was brought forward by the authors with the intention of establishing the absolute want of connection between the Chinese Loess and the present river-systems, its original stratified condition (as shown by variation of tint and horizontality of layers of concretions) and its subsequent rearrangement to a great extent. The absence of marine shells was discussed, and the suggestion thrown out that the shells had been destroyed by percolating water. The authors gave their reasons for supposing that the Loess is a marine formation, and stated that the sea need not have reached to a higher level than 600 feet above the present sea-level, for the Pamir region where it occurs, 7000 feet above the sea, is an area of special uplift. They maintained that there are no proofs of the glaciation of Northern and Eastern Asia, so that Chinese Loess could have no connection with an area of glaciation. The zoological, ethnological, historical and traditionary evidence alike pointed to the former depression of Asia beneath the sea, and the subsequent dessication of the land consequent upon re-elevation. (Nature, March, 1895.)

Geological News, PALEOZOIC.—In studying the remains of Radiolarians and Sponges in the precambrian rocks of Bretagne, M. L. Cayeux arrives at the following conclusions:

(1). There exists at the base of the precambrian of Bretagne numerous sponge spicules representing many species.

(2). All, or at least nearly all, the orders of the siliceous sponges were in existence at this early period.

(3). The precambrian Radiolarians are the oldest known rhizopods, and of the Sponges the phtanites are the first in point of time. (Revue Scientifique Feb., 1895.)

The zinc deposits in the Galena limestone of the Upper Mississippi are unique in that they occur in practically undisturbed strata that show no evidence of metamorphoric action, and are found in crevices of comparatively limited extent downward. The ores are the carbonate, sulphide and silicate. As to their origin, it is suggested by A. G. Leonard that the zinc comes from the limestones in which occur the crevices. It was deposited along with the sediments by the waters of the Silurian sea into which the metallic salts were washed from preexisting land surfaces. After deposition in the limestome beds the zinc was concentrated in the crevices by the action of drainage water percolating through the metal-bearing beds. (Proceeds, Iowa Acad. Sci. Vol. I, Pt. IV, 1894.)

MESOZOIC.—In commenting on the Sauropodous dinosaur recently found in Madagascar, Mr. Lydekker notes first, that it belongs to a hitherto imperfectly known genus, first described from the Jurassic rocks of England, under the name Bothriospondylus; secondly, the lateral cavities of the vertebræ had no connection with any honeycombing of the interior, and, finally, this fossil completes the evidence that gigantic sauropodous dinosaurs ranged over Europe, India, Madagascar and North and South America during the Jurassic and Cretacic periods. From these facts Mr. Lydekker infers that, since the whole world was inhabited by such closely allied reptiles, the great continents were intimately connected with each other, and the evolution of distinct regional faunas and the separation of large southern island-continents (now, for the most part reunited with more northern lands) took place during the early Cenozoic period. (Knowledge, March, 1895.)

The remarkable resemblance of the jaws and dentition of the Cretaceous fish Erisichthe to those of the Upper Jurassic genus Hypsocormus extends to the pectoral fins and the axial skeleton, so that Mr. A. S. Woodward concludes that Erisichthe is not a "Teleostean" in the ordinary acception of the term, and that none of its known characters warrant its separation from the family to which the Jurassic genera Hypsocormus and Pachycormus belong. (Ann. Mag. Nat. Hist. 1894.)

CENOZOIC.—A revision of the Cenozoic deposits of the Texas Coastal Plain has been made necessary through the accumulation of new stratigraphic and paleontologic evidence by the State Geologist, Prof. E. T. Dumble. Of the Eocene beds, the divisions below the Fayette are retained, but the Fayette is limited to the basal sandy portion of the beds originally bearing the name, and characterized by the opalized wood it contains. The succeeding clays are called Frio, and they mark the close of the Eocene. The Neocene divisions, beginning with the lowest, are Oakville, Lapara (the coastal representative of the Blanco), Lagarto and Reynosa. The last is a widely distributed bed of gravel cemented by lime and interbedded with clays and limy sands. The basal beds of the Plistocene are the Equus, the direct correlatives of the Equus of the Llano Estacado, which are followed in turn by the Coast Clays, and the Coast Sands. (Trans. Texas Acad. Sci., 1894).

An account of an important find of Mastodon bones (*M. americanus*) near the city of Cincinnati, Ohio, is given by Mr. Seth Hayes. At least three individuals are represented. One complete jaw of an old animal, as indicated by the excessive amount of wear of the last molars presents the unique feature of two mandibular tusks. On Prof. Orton's authority it is stated that the bed from which these remains were taken is of Postglacial origin. (Journ. Cin. Nat. Hist. Soc., Jan., 1895.)

BOTANY.[1]

Notes on Mexican Lichens. I.—Sometime since a quantity of lichen material from Mexico was placed in my hands for study. The collection was made by Mr. Jared G. Smith and Professor Lawrence Bruner on and about Mt. Orizaba, in the latter part of 1891 and in the months of January and February, 1892.

The following annotated list it given as a report of the results of the study of certain genera represented in the collection, and will be followed from time to time by other "notes" as the remainder of the material is worked over.

Ramalina.

R. linearis (L. f.; Sw.) Tuckerm. Trees, etc. Orizaba. (Bruner 50).

This agrees with specimens in hb. Tuck. under this name, but is not the *linearis* of Nylander. Spores straight or curved, $\frac{12\text{-}18}{4\frac{1}{2}\text{-}7}$ mic.

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[1] Edited by Prof. C. E. Bessey, University of Nebraska, Lincoln, Nebraska.